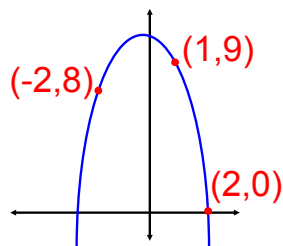


Precalc Warm Up #2-5

1. Find the equation for the parabola:



Precalc Warm Up #2-5

1. Find the equation for the parabola:

We don't know the vertex, so
don't use $y = a(x-h)^2 + k$

We don't know the x-int's so
don't use $y = a(x-d)(x-e)$

Use: $ax^2 + bx + c = y$

from $(2, 0) \rightarrow a(2)^2 + b(2) + c = 0$

$(1, 9) \rightarrow a(1)^2 + b(1) + c = 9$

$(-2, 8) \rightarrow a(-2)^2 + b(-2) + c = 8$

$4a + 2b + c = 0$

$a + b + c = 9$

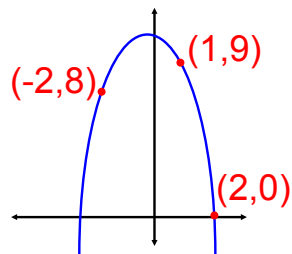
$4a - 2b + c = 8$

solve system

$a =$

$b =$

$c =$



HW Questions? p. 49

1. Express the following functions in turning point form and hence sketch their graphs.

(a) $y = x^2 - 2x + 1$

2. Find the axial intercepts of these quadratic functions (correct to 2 decimal places) and hence sketch their graphs.

(a) $y = x^2 + 3x + 2$

(f) $y = -x^2 + x + 6$

4. For the quadratic function $f(x) = 7 + 4x - 2x^2$, find
- (a) the equation of the axis of symmetry.
 - (b) the coordinates of the vertex. $(1, 9)$
 - (c) the i. x -intercept(s) ii. y -intercept.
- Hence, sketch the graph of the function.

$$y = -2x^2 + 4x + 7$$

$$0 = -2(x-1)^2 + 9$$

$$0 = \pm \sqrt{\frac{9}{2}} = \sqrt{(x-1)^2}$$

$$x - 1 = \pm \frac{3}{\sqrt{2}} \cdot \frac{\sqrt{2}}{\sqrt{2}}$$

$$x = 1 \pm \frac{3\sqrt{2}}{2}$$

5. For what value(s) of k will the graph of $y = x^2 - 3x + k$
- (a) touch the x -axis
 - (b) cut the x -axis
 - (c) never meet the x -axis?

$$b^2 - 4ac = 0 \quad b^2 - 4ac > 0$$

7. For what value(s) of k will the graph of $y = kx^2 - 2x + k$
- (a) touch the x -axis (b) cut the x -axis (c) never meet the x -axis?

$$b^2 - 4ac = 0$$

$$4 - 4(k)(k) = 0$$

$$4 = 4k^2$$

$$k^2 = \pm 1$$

$$b^2 - 4ac > 0$$

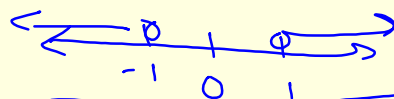
$$b^2 - 4ac < 0$$

$$4 - 4k^2 < 0$$

$$\frac{-4k^2}{-4} < \frac{-4}{-4}$$

$$\sqrt{k^2} > \sqrt{1}$$

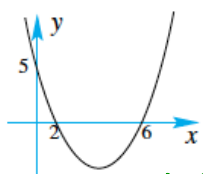
$$|k| > 1$$



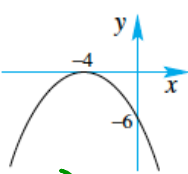
$$k < -1 \text{ or } k > 1$$

8. Find the equation of the quadratic function with graph

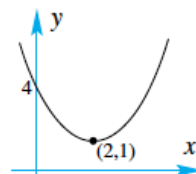
(a)



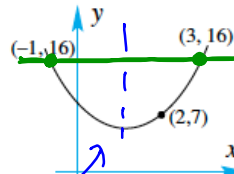
(b)



(c)



(d)



$$y = a(x-2)(x-6)$$

$$\text{So } y = a(x-1)^2 + k$$

$$2 \text{ eq.} \rightarrow (2, 7) \rightarrow 7 = a(2-1)^2 + k$$

$$\boxed{7 = a + k}$$

$$(3, 16) \rightarrow 16 = a(3-1)^2 + k$$

$$\boxed{16 = 4a + k}$$

Solve System.

x of vertex

$$x = \frac{-1 + 3}{2}$$

$$\boxed{x = 1}$$

QUADRATIC INEQUALITIES

Find critical points and test the regions to solve:

$$4x^2 - 19x - 5 < 0$$

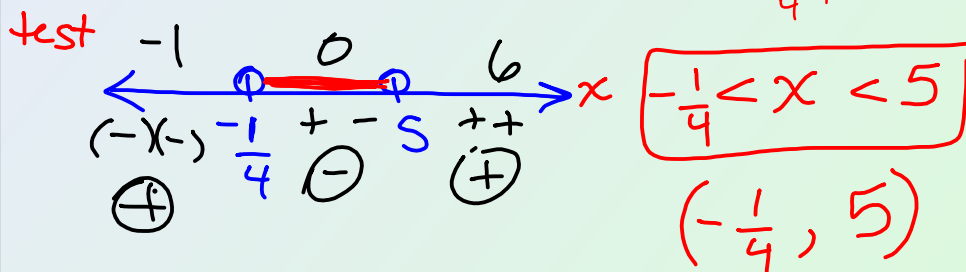
$$(4x+1)(x-5) < 0$$

product
negative

x values where $4x^2 - 19x - 5 = 0$

$$(4x+1)(x-5) = 0$$

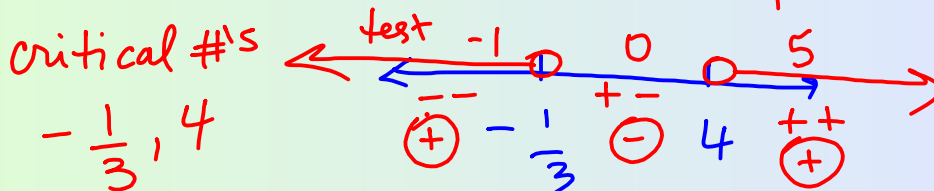
$$x = -\frac{1}{4}, 5$$



Solve: $3x^2 - 11x - 4 > 0$

$$(3x+1)(x-4) > 0$$

positive
product

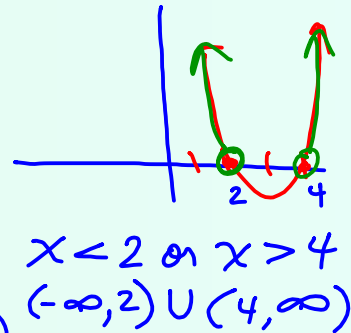


$$x < -\frac{1}{3} \text{ or } x > 4$$

$$(-\infty, -\frac{1}{3}) \cup (4, \infty)$$

Solve $x^2 - 6x > -8$ by the **Graphing Method**

$x^2 - 6x + 8 > 0$
 where (what x)
 is the parabola
 (outcomes, y)
 > 0 (above x -axis)



$$y = x^2 - 6x + 8$$

$$0 = (x - 4)(x - 2)$$

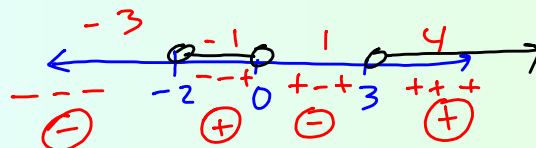
Use the **critical points** method on higher order inequalities that can be factored. Use the **graphing** method on more complicated inequalities.

Solve: $x^3 - x^2 - 6x > 0$

$$x(x^2 - x - 6) > 0$$

$$x(x - 3)(x + 2) > 0$$

positive product

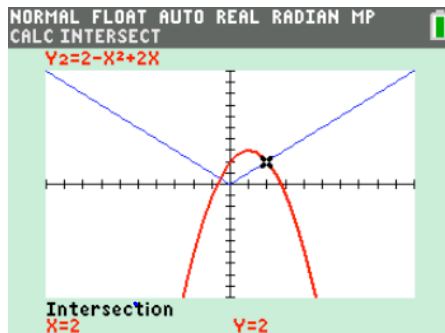


$$-2 < x < 0 \text{ or } x > 3$$

$$(-2, 0) \cup (3, \infty)$$

$$2. |x| < -x^2 + 2x + 2$$

Means:
Absolute value
graph is below
the parabola.



$$\approx -0.56 < x < 2$$

$$(\approx -0.56, 2)$$

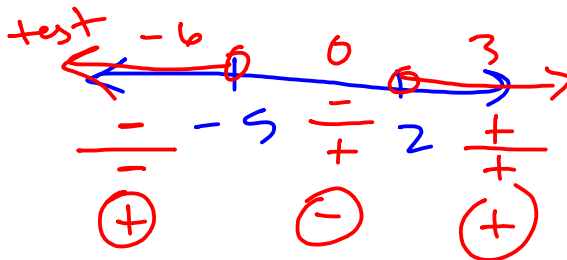
$$x \approx -0.56$$

$$3. \frac{x-2}{x+5} > 0$$

positive
quotient

critical #'s

2, -5



$$(-\infty, -5) \cup (2, \infty)$$

For what value(s) of k is $x^2 + 3kx - k > 0$ true for all x ?

outcomes
are > 0

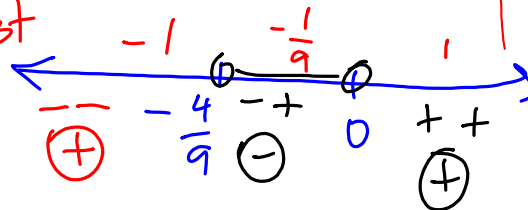
$$b^2 - 4ac < 0$$

$$(3k)^2 - 4(1)(-k) < 0$$

$$9k^2 + 4k < 0$$

$$k(9k + 4) < 0 \quad \text{Neg product}$$

test



$$9\left(-\frac{1}{9}\right) + 4$$

$$-1 + 4$$

$$3$$

$$-\frac{4}{9} < k < 0$$

HW: p. 54 #1abc, 2 LC,

3, 5, 6, 8a

The answer for #3b is wrong in your book.